INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 1995	**Park:** Shenandoah NP
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Additional investigators or key field assistants (first name, last name, office phone, office email):

No co-investigators

Permit#:
SHEN1995ANNV

Park-assigned Study Id. #:
unknown

Project Title:
Nitrate In Streamwater: Catchment Sources And Gypsy Moth Effects

Permit Start Date: Jan 01, 1998	**Permit Expiration Date** Jan 01, 1998
Study Start Date: Jan 01, 1994	**Study End Date** Jan 01, 1997

Study Status:
Completed

Activity Type:
Other

Subject/Discipline:
Other

Objectives:
To determine the sources of nitrate that appear in streamwater following gypsy moth defoliation.

Findings and Status:
High nitrification potentials, measured in 3-wk lab incubations, were found in the organic horizons of both red oak (range 2.63-2.92 ug N/g dry soil/day, n=3) and tulip poplar (3.09-4.34 ug N/g/d, n=3) soils. Much lower rates were found in the A horizons, and there was an absence of net nitrate or ammonium production during incubations of soils from the perennial seep (whether this was due to efficient nitrogen consumption or to a lack of nitrate and ammonium production could not be determined with the methods used). Autotrophic nitrifier populations, measured in the tulip poplar soils only, were higher in the O horizon (ranging from 35 to 3500 cells/g dry soil) than in the A horizon (no nitrifying autotrophs found), consistent with higher rates of nitrification in the O horizon than in the A. Significant nitrification potential (2.63-2.92 ug N/g/d, n=3) was found in soil with low pH (4.57, measured in duplicate in 1:5 soil:DIW slurries), although the highest nitrification rate (3.09-4.45 ugN/g/d, n=3) was associated with the highest (1.69 +/- 1.03 ug N/g/d, n=3) rates found in the tulip poplar O horizon, followed by the red oak O horizon (0.43 +/- 0.59 ug N/g/d, n=3).; Amendment of a set of incubations with an organic nitrogen source initially markedly increased, then decreased, nitrification rates in all soils; whereas the addition of fresh leaf litter to a separate set of incubations drastically reduced net rates of nitrogen transformations. The existence of high nitrification potentials may suggest that nitrification is the major contributor (as opposed, for example, to atmospheric nitrate imputs) to the nitrate appearing after gypsy moth distrubance. The spatial variability in soil nitrification potential, as well as the sensitivity to various soil amendments, suggests that this important process is dynamic and complex in Shaver Hollow soils and motivates our continued research plans.

For this study, were one or more specimens collected and removed from the park but not destroyed during analyses?
No

Funding provided this reporting year by NPS: 0	**Funding provided this reporting year by other sources:** 10000

Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college	
Full name of college or university:	**Annual funding provided by NPS to university or college this reporting year:**
n/a	0